

and revise the plan to correct the significant policy and regulatory defects of its proposed approach.

**3. The Commission Must Encourage Realistic Spectrum Sharing Wherever Feasible**

Another defect in the Commission's approach is its apparent decision to close the door on frequency sharing over substantial portions of the 36-51.4 GHz band between space-based communications systems and terrestrial wireless services. Lockheed Martin believes that it is premature for the Commission to limit the prospects for sharing between such services until it becomes clearer what types of proposals are being made for the spectrum at issue. All realistic sharing possibilities should be explored, and even where the details are currently unproved, care should be taken not to foreclose preemptively opportunities for co-frequency operation.<sup>15</sup> If this requires the imposition of technical regulations that require efficient use of spectrum by terrestrial and satellite systems — as opposed to a laissez faire approach that allows currently proposed characteristics to be utilized without regard to the maximization of efficiency — the Commission must be prepared to take this step. Finally, as a further means of maximizing spectrum use, Lockheed Martin supports, in principle, the Commission's suggestion that some spectrum may be appropriate for sharing between government and non-government satellite and terrestrial users, where such sharing is feasible.<sup>16</sup>

**4. The Commission Must Defer Finalizing Any Domestic Allocations Until The Full International Picture Is Known.**

Several of the proposals contained in the Commission's band plan require changes in the international frequency tables — either to add new services to particular bands or to upgrade existing secondary allocations to co-primary status. As the

---

<sup>15</sup> Similarly, Lockheed Martin also believes it is premature for the Commission to segment FSS spectrum between GSO and NGSO. For example, in the ITU-R Study Groups and in the CPM process, the US has supported the continuous examination of possible sharing scenarios studies between GSO and NGSO FSS sharing.

<sup>16</sup> See NPRM, FCC 97-85, Slip OP. at 10 (¶ 18)

Commission is well aware, proposals of this nature are fraught with risk of possible rejection through the WRC process. Given these dangers, the Commission cannot reasonably proceed with any part of its proposal without first making sure that the entire package it ultimately decides to embrace is accomplished internationally. Any other course of action will prejudice the interests of the services that rely on international allocation changes.

The best near term opportunity to gauge the sentiment among other ITU members concerning these issues will be the Conference Preparatory Meeting ("CPM") for WRC-97, which commences today and is scheduled to conclude on May 16, just three days before the due date for Reply comments in this proceeding. Given the fact that developments at the CPM may provide some insight into the international viability of whatever band plan the US should ultimately decide to pursue at WRC-97, it may be advisable to permit parties the opportunity to file reply comments after the developments at the CPM can be fully digested.<sup>17</sup>

In any event, because of the uncertainty inherent in seeking changes to the international allocation tables, the Commission must not move to finalize a domestic spectrum plan for the subject bands until the necessary international changes are definitively secured. It must also take no action in any of the other proceedings mentioned in the NPRM<sup>18</sup> that would prejudice in any way the reaching of an omnibus solution in the instant proceeding. Accordingly, it will likely be necessary to delay adoption of a final frequency plan until after WRC-97.<sup>19</sup>

---

<sup>17</sup> In this case, Lockheed Martin believes that a 30 day extension of the reply comment deadline in this proceeding — to June 18, 1997 — is warranted, and is filing simultaneously with these comments an extension request to this end.

<sup>18</sup> See Amendment of Parts 2, 15, and 97 of the Commission's Rules to Permit Use of Radio Frequencies Above 40 GHz for New Radio Applications, 11 FCC Rcd 4481 (1995); Amendment of the Commission's Rules Regarding the 37.0-38.6 GHz and 38.6-40.0 GHz Bands, 11 FCC Rcd 5930 (1995).

<sup>19</sup> A possible exception to this would be 38.5-39.5 GHz.

**B. The Commission's Proposed Band Plan Has A Number Of Substantial Defects.**

**1. Proposed FSS Downlink Bands**

The gravest defect in the Commission plan set forth in the NPRM is its proposal not to permit FSS in two-thirds of the downlink band that is allocated in the international tables (37.5-40.5 GHz). The Commission would preserve only the 37.5-38.5 GHz segment of this spectrum band for satellite service, and would further limit its use to non-geostationary FSS proposals.<sup>20</sup> Other FSS use for geostationary proposals would be forced into the lower portion of the current BSS band between 40.5 and 42.5 GHz, with the Commission further proposing to make the upper 1 GHz of this band available for terrestrial wireless services rather than BSS. Even the proposal to make the 37.5-38.5 GHz band available for satellites is deficient, however, because wireless services that are incompatible with ubiquitous-user satellite operators are already using the 37.0 - 39.5 GHz band in Europe.<sup>21</sup> Thus, such a proposal appears inconsistent with the Commission's stated goal of achieving global allocations. The effect of this odd rejigging is to eliminate entirely all downlink spectrum available on a global basis for each of the existing satellite services, except for the 40.5 - 41.5 GHz band in which FSS and BSS would be thrown together. Furthermore, the terrestrial downlink allocation for MSS (at 40.0-40.5 GHz) is eliminated entirely for domestic U.S. purposes under this proposal.

In addition, the Commission should refrain from adopting a 36-51.4 GHz band plan which upgrades the terrestrial (fixed and mobile) allocations from secondary to primary in the 40.5-42.5 GHz band. This band is allocated internationally and domestically to BSS (downlinks), and does not include any primary terrestrial fixed or

---

<sup>20</sup> See NPRM, FCC 97-85, slip op. at 7 (Chart) and 11-12 (¶ 21).

<sup>21</sup> Although the Commission took some international factors into account (see NPRM, FCC 97-85 slip op. at 4 (¶ 10)), the apparent unavailability of the band 37.5-38.5 GHz for satellite use in ITU Region 1 — a situation that would render the band inappropriate for global FSS systems — seems not to have been one of them.

mobile allocation as a result of sharing difficulties.<sup>22</sup> Thus, the proposed upgrade of the terrestrial fixed and mobile allocations to primary in any portion of this band, which may lead to unavoidable sharing difficulties, should be preceded by closer technical study in order to avoid rendering the band useless for global BSS (uplinks). Lockheed Martin, however, believes that sufficient spectrum for terrestrial fixed and mobile services can be identified in the 36-51.4 GHz band without sacrificing the BSS allocation in the 40.5-42.5 GHz band.<sup>23</sup>

The practical implication of the Commission's proposal for the 40.5-42.5 GHz band is the elimination of the global BSS allocation there, without sufficient regard for the domestic requirements for expansion BSS spectrum. Internationally, there is a severe shortage of global BSS spectrum in the planned bands at 12 GHz, and the 40.5-42.5 GHz band is a logical overflow band. There also are acute sensitivities, particularly among developing nations, when it comes to BSS spectrum, and these sensitivities might be heightened by a U.S. proposal that may effectively foreclose the use of BSS in any band where it currently exists or adds new FSS allocations in existing BSS bands. Notwithstanding the political aspects, if the Commission is to propose at WRC-97 that FSS also be allocated in the 40.5 -41.5 GHz band it must be on world-wide basis (not just in Region 2) to ensure that US companies providing FSS service have the opportunity to do so globally. Moreover, Lockheed Martin feels that the Commission cannot allow primary terrestrial fixed and mobile allocations in the frequency range 40.5 - 42.5 GHz. Furthermore, a primary allocation to FSS in the current BSS band will not safeguard future FSS orbital resources from the effects of any future BSS planning of the band.<sup>24</sup>

---

<sup>22</sup> Previous action in the 12 GHz BSS band is an indication of the Commission's recognition that BSS (downlinks) and terrestrial fixed services generally cannot share.

<sup>23</sup> With respect to the 40.5 to 41.5 GHz band, the Commission correctly notes that the operation of GSO FSS and BSS systems generally have similar technical characteristics and there is no overwhelming evidence that this would not be the case in the 40 GHz band. However, proposing that two services share the same spectrum does reduce the availability of spectrum/orbital resources for both services. Depending on the orbital spacing and other technical rules that the Commission imposes on the relevant bands this could significantly reduce the number of satellite entities able to compete in the provision of either service.

<sup>24</sup> It should be noted that WRC- Resolution 507 in the International Radio Regulations calls for the planning of all bands allocated to BSS.

The spectrum plan for these frequencies needs to be retooled in light of the principles outlined above, particularly the need for satellite allocations that can be implemented on a global basis. In light of the existing wireless uses in Europe below 39.5 GHz, it would seem appropriate for the U.S. to proceed with terrestrial high density fixed services ("HDFS") in the band 38.6-39.5 GHz, but to defer any further licensing for such use from 39.5-40 GHz pending a determination whether this band might be shared with satellite systems, and if so, under what conditions.

## **2. Proposed FSS Uplink Bands**

The Commission's plan for the FSS uplink bands, while somewhat less problematic than the downlink band, also has significant defects. First, with the proposals to allocate the band 47.2-48.2 GHz to terrestrial services and the band 48.2-49.2 GHz to NGSO FSS, the Commission has totally removed the prospect for BSS feeder links in the band 47.2-49.2 GHz. BSS feeder links are given a preference in these bands by operation of Radio Regulation S5.552. Apart from the proposal of one terrestrial user — which seeks 600 MHz of spectrum in the band 47.2-48.2 GHz for a system of stratospheric repeaters, there is no known requirement for terrestrial systems on the FSS uplink bands.<sup>25</sup>

Second, the Commission does not contemplate that any type of sharing is possible between satellite users (e.g., BSS feeder links or other large-dish operators) and terrestrial systems in the 47.2-48.2 GHz band. There have been, however, some favorable preliminary indications in U.S. contributions to the ITU-R Study Groups that some sharing is possible in this band. For example, Sky Station has proposed that

---

<sup>25</sup> See *Application of Sky Station International, Inc. for Authority to Construct, Deploy, and Operate a Global Stratospheric Telecommunications System*, File No. 96-SAT-P/LA-96 (Mar. 20, 1996). It is interesting to note that Sky Station has indicated that "it can deploy its platforms economically and conduct its proposed" fixed service "operations with as little as 10+10 MHz of bandwidth", while the 300+300 MHz request is based on market studies which "project a need for more than 250 million [simultaneous] broadband channels worldwide." See Sky Station's Reply Comments at 8, ET Docket 94-124. Since Sky Station can reuse the same frequencies throughout the world, this may allow a reduction in the bandwidth designated to stratospheric repeaters.

sharing with BSS feeder links may be a possibility. This should be factored into the revision of the band plan.

### 3. Proposed "Underlay" Wireless Services

Finally, the Commission has raised the possibility of issuing "underlay" licenses to terrestrial users in bands designated for FSS use to the extent that potential terrestrial uses of these frequencies are not exhausted by the satellite uses. While, as a general matter, Lockheed Martin supports efforts to maximize spectral efficiency, it is entirely unclear just what the Commission intends by the "underlay" notion. Indeed, the Commission specifically raises the question of how an "underlay" service might be distinguished from a secondary service. (NPRM, FCC 97-85, slip op. at 13 (¶ 24).) Given the fact that the Commission suggests that this use "would not interfere with the predominant use" (NPRM, FCC 97-85 slip op. at 12 (¶ 23)), it seems logical to conclude that an underlay service would either be secondary, or would be a hybrid between primary and secondary status, *i.e.*, neither causing interference to primary users nor receiving protection from them, while at the same time having priority over any other use in the band. In fact, in most instances there would appear to be no substantive difference between the two approaches as they would apply to terrestrial wireless services, either because they are currently the only secondary service allocated in a particular band or because FSS and fixed and mobile services are the only primary services in the band.<sup>26</sup> Yet the Commission also notes that "underlay operations may need to be restricted so that they do not substantially impact" the predominant use of the band. Therefore, Lockheed Martin seeks clarification of what is intended by the concept of "underlay" licensing.

### III. CONCLUSION

As described in the foregoing comments, many challenges lie ahead in adapting the initial band plan proposal offered by the Commission to take into account both existing frequency use around the world and the emerging requirements of both

---

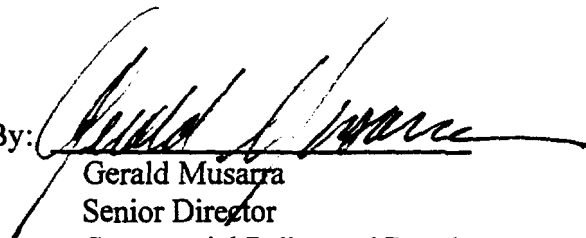
<sup>26</sup> One exception would be the 37.5-38 GHz band, where there is a primary downlink allocation for Space Research and a secondary downlink allocation for the Earth Exploration-Satellite Service.

satellite and terrestrial users. Lockheed Martin believes strongly that any further action in the domestic proceeding should await the outcome of WRC-97, and that an equitable international allocation proposal must be developed and obtained at WRC-97, for subsequent implementation domestically. Under the current proposal in the NPRM, the US satellite industry would suffer a serious setback that would have a profound negative impact on the development of future advanced satellite communications networks. Lockheed Martin is fully prepared, however, to continue making the substantial efforts that will be necessary in the upcoming months to improve and refine this initial proposal, and it is committed to taking a leadership role in this process.

Respectfully submitted,

LOCKHEED MARTIN CORPORATION

By:



Gerald Musarra  
Senior Director  
Commercial Policy and Regulatory  
Affairs  
Space and Strategic Missiles Sector

Lockheed Martin Corporation  
1725 Jefferson Davis Highway  
Arlington, VA 22202  
(703) 413-5791

May 5, 1997